4-31452A.ST25.txt SEQUENCE LISTING

<110> Novartis AG <120> Adenovirus particles with mutagenized fiber proteins <130> 4-31452A <160> 43 <170> PatentIn version 3.0 <210> <211> 1746 DNA <212> <213> Human adenovirus type 5 <220> <221> CDS <222> (1)..(1746) <400> 1 atg aag cgc gca aga ccg tct gaa gat acc ttc aac ccc gtg tat cca Met Lys Arg Ala Arg Pro Ser Glu Asp Thr Phe Asn Pro Val Tyr Pro 1 5 10 15 tat gac acg gaa acc ggt cct cca act gtg cct ttt ctt act cct ccc Tyr Asp Thr Glu Thr Gly Pro Pro Thr Val Pro Phe Leu Thr Pro Pro 20 25 30 ttt gta tcc ccc aat ggg ttt caa gag agt ccc cct ggg gta ctc tct 1 Phe Val Ser Pro Asn Gly Phe Gln Glu Ser Pro Pro Gly Val Leu Ser 35 40 45 ttg cgc cta tcc gaa cct cta gtt acc tcc aat ggc atg ctt gcg ctc Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu 50 55 60

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Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu 50 55 60

Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser 65 7075 80

Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn $85 \\ 90 \\ 95$

Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu $100 \hspace{1.5cm} 105 \hspace{1.5cm} 110 \hspace{1.5cm}$

Thr Val Ala Ala Ala Ala Pro Leu Met Val Ala Gly Asn Thr Leu Thr 115 120 125

Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile 130 $$135\$

Ala Thr Gln Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Ala Leu Gln 145 150 150 160

Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr 165 170 175

Ala Ser Pro Pro Leu Thr Thr Ala Thr Gly Ser Leu Gly Ile Asp Leu 180 185 190

Lys	Glu	Pro	Ile	Tyr	Thr	Gln	Asn	Gly	Lys	Leu	Gly	Leu	Lys	Tyr	Gly
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- Val Asn Leu Ser Thr Ala Lys Gly Leu Met Phe Asp Ala Thr Ala Ile 325 330 335
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- Ser Asn Lys Ala Met Val Pro Lys Leu Gly Thr Gly Leu Ser Phe Asp 370 375 380

Ser Thr Gly Ala Ile Thr Val Gly Asn Lys Asn Asn Asp Lys Leu Thr 385 390 395 400

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Lys Asp Ala Lys Leu Thr Leu Val Leu Thr Lys Cys Gly Ser Gln Ile \$420\$ \$425\$ \$430

Leu Ala Thr Val Ser Val Leu Ala Val Lys Gly Ser Leu Ala Pro Ile 435 440 445

Ser Gly Thr Val Gln Ser Ala His Leu Ile Ile Arg Phe Asp Glu Asn 450 455 460

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Arg Asn Gly Asp Leu Thr Glu Gly Thr Ala Tyr Thr Asn Ala Val Gly 485 490 495

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Lys Ser Asn Ile Val Ser Gln Val Tyr Leu Asn Gly Asp Lys Thr Lys $515 \hspace{1.5cm} 520 \hspace{1.5cm} 525$

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                                                         15
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            20
                                 25
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165

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Phe Val Ser Pro Asn Gly Phe Gln Glu Ser Pro Pro Gly Val Leu Ser 35  $\,$  40  $\,$  45

Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu 50 60

Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser 65  $\phantom{000}70\phantom{000}$  75  $\phantom{0000}80\phantom{000}$ 

Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn 85 90 95

Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu 100 105 110

Thr Val Ala Ala Ala Ala Pro Leu Met Val Ala Gly Asn Thr Leu Thr 115 120 125

Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile 130 135 140

Ala Thr Gln Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Ala Leu Gln 145 150 150 160

Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr 165 170 175

Ala Ser Pro Pro Leu Thr Thr Ala Thr Gly Ser Leu Gly Ile Asp Leu 180 185 190

- Lys Glu Pro Ile Tyr Thr Gln Asn Gly Lys Leu Gly Leu Lys Tyr Gly
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- Ala Pro Leu His Val Thr Asp Asp Leu Asn Thr Leu Thr Val Ala Thr 210 215 220
- Gly Pro Gly Val Thr Ile Asn Asn Thr Ser Leu Gln Thr Lys Val Thr 225 230 235
- Gly Gly Leu Arg Ile Asp Ser Gln Asn Arg Arg Leu Ile Leu Asp Val260 265 270
- Ser Tyr Pro Phe Asp Ala Gln Asn Gln Leu Asn Leu Arg Leu Gly Gln 275 280 285
- Gly Pro Leu Phe Ile Asn Ser Ala His Asn Leu Asp Ile Asn Tyr Asn 290  $\phantom{\bigg|}295\phantom{\bigg|}300\phantom{\bigg|}$
- Lys Gly Leu Tyr Leu Phe Thr Ala Ser Asn Asn Ser Lys Lys Leu Glu 305 310 315 320
- Val Asn Leu Ser Thr Ala Lys Gly Leu Met Phe Asp Ala Thr Ala Ile 325 330 335
- Ala Ile Asn Ala Gly Asp Gly Leu Glu Phe Gly Ser Pro Asn Ala Pro 340 345 350
- Asn Thr Asn Pro Leu Lys Thr Lys Ile Gly His Gly Leu Glu Phe Asp 355 360 365
- Ser Asn Lys Ala Met Val Pro Lys Leu Gly Thr Gly Leu Ser Phe Asp 370

Ser Thr Gly Ala Ile Thr Val Gly Asn Lys Asn Asn Asp Lys Leu Thr 385 390 395 400

Leu Trp Thr Thr Pro Ala Pro Glu Ala Asn Cys Arg Leu Asn Ala Glu 405 410 415

Lys Asp Ala Lys Leu Thr Leu Val Leu Thr Lys Cys Gly Ser Gln Ile 420 425 430

Leu Ala Thr Val Ser Val Leu Ala Val Lys Gly Ser Leu Ala Pro Ile  $435 \hspace{1.5cm} 440 \hspace{1.5cm} 445 \hspace{1.5cm}$ 

Ser Gly Thr Val Gln Ser Ala His Leu Ile Ile Arg Phe Asp Glu Asn 450 450 460

Gly Val Leu Leu Asn Asn Ser Phe Leu Asp Pro Glu Tyr Trp Asn Phe 465  $\phantom{\bigg|}470\phantom{\bigg|}470\phantom{\bigg|}475\phantom{\bigg|}475\phantom{\bigg|}$ 

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Phe Met Pro Asn Leu Ser Ala Tyr Pro Lys Ser His Gly Lys Thr Ala 500 505 510

Lys Ser Asn Ile Val Ser Gln Val Tyr Leu Asn Gly Asp Lys Thr Lys 515 520 525

Thr Thr Pro Ser Ala Tyr Ser Met Ser Phe Ser Trp Asp Trp Ser Gly 545 550 550 555

His Asn Tyr Ile Asn Glu Ile Phe Ala Thr Ser Ser Tyr Thr Phe Ser 565 570 575

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### 4-31452A.ST25.txt

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55

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Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser 65 70 75 80

Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn 85 90 95

Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu 100 \$105\$

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Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile 130 135 140

Ala Thr Gln Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Ala Leu Gln 145 150 155 160

Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr 165 170 175

Ala Ser Pro Pro Leu Thr Thr Ala Thr Gly Ser Leu Gly Ile Asp Leu 180 185 190

Lys Glu Pro Ile Tyr Thr Gln Asn Gly Lys Leu Gly Leu Lys Tyr Gly
195 200 205

Ala Pro Leu His Val Thr Asp Asp Leu Asn Thr Leu Thr Val Ala Thr 210 215 220

Gly Pro Gly Val Thr Ile Asn Asn Thr Ser Leu Gln Thr Lys Val Thr 225 230 235

Gly Ala Leu Gly Phe Asp Ser Gln Gly Asn Met Gln Leu Asn Val Ala  $245 \hspace{1.5cm} 250 \hspace{1.5cm} 255$ 

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Gly Pro Leu Phe Ile Asn Ser Ala His Asn Leu Asp Ile Asn Tyr Asn 290 295 300

Lys Gly Leu Tyr Leu Phe Thr Ala Ser Asn Asn Ser Lys Lys Leu Glu 305 310 315 320

Val Asn Leu Ser Thr Ala Lys Gly Leu Met Phe Asp Ala Thr Ala Ile 325 330 335

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Asn Thr Asn Pro Leu Lys Thr Lys Ile Gly His Gly Leu Glu Phe Asp  $355 \hspace{1.5cm} 360 \hspace{1.5cm} 365 \hspace{1.5cm}$ 

Ser Asn Lys Ala Met Val Pro Lys Leu Gly Thr Gly Leu Ser Phe Asp 370 380

Ser Thr Gly Ala Ile Thr Val Gly Asn Lys Asn Asn Asp Lys Leu Thr 385 390 395 400

Lys Asp Ala Lys Leu Thr Leu Val Leu Thr Lys Cys Gly Ser Gln Ile 420 425 430

Leu Ala Thr Val Ser Val Leu Ala Gly Ser Leu Ala Pro Ile Ser Gly  $435 \hspace{1.5cm} 440 \hspace{1.5cm} 445 \hspace{1.5cm}$ 

Thr Val Gln Ser Ala His Leu Ile Ile Arg Phe Asp Glu Asn Gly Val  $_{\rm 450}$ 

Leu Leu Asn Asn Ser Phe Leu Asp Pro Glu Tyr Trp Asn Phe Arg Asn 465 470 475 480

Gly Asp Leu Thr Glu Gly Thr Ala Tyr Thr Asn Ala Val Gly Phe Met 485 490 495

Pro Asn Leu Ser Ala Tyr Pro Lys Ser His Gly Lys Thr Ala Lys Ser 500 505 510

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Ala Gln Glu

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                                                 45
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	Thr	Asn	Pro	Leu	Lys	Thr	Lys	Ile	Gly	His	Gly	Leu	Glu	Phe	Asp	
		355					360					365				
tca 52	aac	aag	gct	atg	gtt	cct	aaa	cta	gga	act	ggc	ctt	agt	ttt	gac	11
	Asn	Lys	Ala	Met	Val	Pro	Lys	Leu	Gly	Thr	Gly	Leu	Ser	Phe	Asp	
	370					375					380					
agc	aca	ggt	gcc	att	aca	gta	gga	aac	aaa	aat	aat	gat	aag	cta	act	12
	Thr	Gly	Ala	Ile	Thr	Val	Gly	Asn	Lys	Asn	Asn	Asp	Lys	Leu	Thr	

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ttg 48	tgg	acc	aca	cca	gct	cca	gag	gct	aac	tgt	aga	cta	aat	gca	gag	12
	Trp	Thr	Thr	Pro	Ala	Pro	Glu	Ala	Asn	Cys	Arg	Leu	Asn	Ala	Glu	
				405					410					415		
aaa 96	gat	gct	aaa	ctc	act	ttg	gtc	tta	aca	aaa	tgt	ggc	agt	caa	ata	12
	Asp	Ala	Lys	Leu	Thr	Leu	Val	Leu	Thr	Lys	Cys	Gly	Ser	Gln	Ile	
			420					425					430			
ctt	gct	aca	gtt	tca	gtt	ttg	gcc	ggc	agt	ttg	gct	cca	ata	tct	gga	13
44 Leu	Ala	Thr	Val	Ser	Val	Leu	Ala	Gly	Ser	Leu	Ala	Pro	Ile	Ser	Gly	
		435					440					445				
aca 92	gtt	caa	agt	gct	cat	ctt	att	ata	aga	ttt	gac	gaa	aat	gga	gtg	13
	Val	Gln	Ser	Ala	His	Leu	Ile	Ile	Arg	Phe	Asp	Glu	Asn	Gly	Val	
	450					455					460					
cta 40	cta	aac	aat	tcc	ttc	ctg	gac	cca	gaa	tat	tgg	aac	ttt	aga	aat	14
	Leu	Asn	Asn	Ser	Phe	Leu	Asp	Pro	Glu	Tyr	Trp	Asn	Phe	Arg	Asn	
465					470					475					480	
gga 88	gat	ctt	act	gaa	ggc	aca	gcc	tat	aca	aac	gct	gtt	gga	ttt	atg	14
Gly	Asp	Leu	Thr	Glu	Gly	Thr	Ala	Tyr	Thr	Asn	Ala	Val	Gly	Phe	Met	
				485					490					495		
36	aac															15
Pro	Asn	Leu	Ser	Ala	Tyr	Pro	Lys			Gly	Lys	Thr	Ala	Lys	Ser	
								Page	32							

510

aac att qtc aqt caa qtt tac tta aac gga gac aaa act aaa cct gta 15 Asn Ile Val Ser Gln Val Tyr Leu Asn Gly Asp Lys Thr Lys Pro Val 515 520 525 aca cta acc att aca cta aac ggt aca cag gaa aca gga gac aca act 16 Thr Leu Thr Ile Thr Leu Asn Gly Thr Gln Glu Thr Gly Asp Thr Thr 540 535 530 cca agt gca tac tct atg tca ttt tca tgg gac tgg tct ggc cac aac 16 Pro Ser Ala Tyr Ser Met Ser Phe Ser Trp Asp Trp Ser Gly His Asn 555 560 550 545 tac att aat gaa ata ttt gcc aca tcc tct tac act ttt tca tac att 17 Tyr Ile Asn Glu Ile Phe Ala Thr Ser Ser Tyr Thr Phe Ser Tyr Ile 570 575 565 17 gcc caa gaa taa 40

<210> 8 <211> 579

Ala Gln Glu

<212> PRT <213> Artificial

500

<400> 8

Met Lys Arg Ala Arg Pro Ser Glu Asp Thr Phe Asn Pro Val Tyr Pro Page 33

COESO, EDSOZBED

in the

Tyr Asp Thr Glu Thr Gly Pro Pro Thr Val Pro Phe Leu Thr Pro Pro Phe Val Ser Pro Asn Gly Phe Gln Glu Ser Pro Pro Gly Val Leu Ser Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu Thr Val Ala Ala Ala Ala Pro Leu Met Val Ala Gly Asn Thr Leu Thr Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile Ala Thr Gln Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Ala Leu Gln Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr Ala Ser Pro Pro Leu Thr Thr Ala Thr Gly Ser Leu Gly Ile Asp Leu 

Lys Glu Pro Ile Tyr Thr Gln Asn Gly Lys Leu Gly Leu Lys Tyr Gly Page 34

Ala Pro Leu His Val Thr Asp Asp Leu Asn Thr Leu Thr Val Ala Thr 210  $\phantom{\bigg|}215\phantom{\bigg|}$  220

Gly Pro Gly Val Thr Ile Asn Asn Thr Ser Leu Gln Thr Lys Val Thr 225  $\phantom{\bigg|}$  230  $\phantom{\bigg|}$  235  $\phantom{\bigg|}$  240

Gly Ala Leu Gly Phe Asp Ser Gln Gly Asn Met Gln Leu Asn Val Ala 245 250 255

Gly Gly Leu Arg Ile Asp Ser Gln Asn Arg Arg Leu Ile Leu Asp Val  $260 \hspace{1cm} 265 \hspace{1cm} 270 \hspace{1cm}$ 

Gly Pro Leu Phe Ile Asn Ser Ala His Asn Leu Asp Ile Asn Tyr Asn 290 295 300

Lys Gly Leu Tyr Leu Phe Thr Ala Ser Asn Asn Ser Lys Lys Leu Glu 305 \$310\$

Val Asn Leu Ser Thr Ala Lys Gly Leu Met Phe Asp Ala Thr Ala Ile 325 335 330 335

Ala Ile Asn Ala Gly Asp Gly Leu Glu Phe Gly Ser Pro Asn Ala Pro 340 345 350

Asn Thr Asn Pro Leu Lys Thr Lys Ile Gly His Gly Leu Glu Phe Asp 355 360 365

Ser Thr Gly Ala Ile Thr Val Gly Asn Lys Asn Asn Asp Lys Leu Thr Page 35 TODESO" COSOLEGOS

Lys Asp Ala Lys Leu Thr Leu Val Leu Thr Lys Cys Gly Ser Gln Ile 420 425 430

Leu Ala Thr Val Ser Val Leu Ala Gly Ser Leu Ala Pro Ile Ser Gly  $435 \ \ \, 440 \ \ \, 445$ 

Thr Val Gln Ser Ala His Leu Ile Ile Arg Phe Asp Glu Asn Gly Val  $_{\rm 450}$ 

Leu Leu Asn Asn Ser Phe Leu Asp Pro Glu Tyr Trp Asn Phe Asp Asn 465  $\phantom{\bigg|}470\phantom{\bigg|}470\phantom{\bigg|}470\phantom{\bigg|}$ 

Gly Asp Leu Thr Glu Gly Thr Ala Tyr Thr Asn Ala Val Gly Phe Met 485 490 495

Pro Asn Leu Ser Ala Tyr Pro Lys Ser His Gly Lys Thr Ala Lys Ser 500 505 510

Pro Ser Ala Tyr Ser Met Ser Phe Ser Trp Asp Trp Ser Gly His Asn 545  $\phantom{0}550$   $\phantom{0}555$   $\phantom{0}555$ 

Tyr Ile Asn Glu Ile Phe Ala Thr Ser Ser Tyr Thr Phe Ser Tyr Ile 565 570 575

Ala Gln Glu

<210> 1743 <211> <212> DNA Artificial <213> <220> Codes for a mutated Human Adenovirus type 5 fiber protein. Nuc <223> le otides corresponding to amino acid 441(V) of wild-type fiber wa deleted <220> <221> CDS (1)..(1743) <222> <400> 9 atg aag cgc gca aga ccg tct gaa gat acc ttc aac ccc gtg tat cca Met Lys Arg Ala Arg Pro Ser Glu Asp Thr Phe Asn Pro Val Tyr Pro 10 15 5 1 tat gac acg gaa acc ggt cct cca act gtg cct ttt ctt act cct ccc Tyr Asp Thr Glu Thr Gly Pro Pro Thr Val Pro Phe Leu Thr Pro Pro 20 25 30 ttt qta tcc ccc aat ggg ttt caa gag agt ccc cct ggg gta ctc tct 1 Phe Val Ser Pro Asn Gly Phe Gln Glu Ser Pro Pro Gly Val Leu Ser 40 45 35 ttg cgc cta tcc gaa cct cta gtt acc tcc aat ggc atg ctt gcg ctc 1 Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu 55 60 50

#### 4-31452A.ST25.txt aaa atg ggc aac ggc ctc tct ctg gac gag gcc ggc aac ctt acc tcc Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser caa aat gta acc act gtg agc cca cct ctc aaa aaa acc aag tca aac Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn ata aac ctg gaa ata tct gca ccc ctc aca gtt acc tca gaa gcc cta Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu act qtq qct gcc qcc qca cct cta atg gtc qcq ggc aac aca ctc acc Thr Val Ala Ala Ala Ala Pro Leu Met Val Ala Gly Asn Thr Leu Thr atg caa toa cag goo cog cta acc gtg cac gac toc aaa ott agc att Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile gee acc caa gga eec etc aca gtg tca gaa gga aag eta gee etg caa Ala Thr Gln Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Ala Leu Gln aca toa ggo coo oto aco aco gat ago agt aco ott act ato act

Page 38

Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr

gcc 76	tca	ccc	cct	cta	act	act	gcc	act	ggt	agc	ttg	ggc	att	gac	ttg	5
	Ser	Pro	Pro	Leu	Thr	Thr	Ala	Thr	Gly	Ser	Leu	Gly	Ile	Asp	Leu	
			180					185					190			
aaa 24	gag	ccc	att	tat	aca	caa	aat	gga	aaa	cta	gga	cta	aag	tac	ggg	6
	Glu	Pro	Ile	Tyr	Thr	Gln	Asn	Gly	Lys	Leu	Gly	Leu	Lys	Tyr	Gly	
		195					200					205				
gct 72	cct	ttg	cat	gta	aca	gac	gac	cta	aac	act	ttg	acc	gta	gca	act	6
	Pro	Leu	His	Val	Thr	Asp	Asp	Leu	Asn	Thr	Leu	Thr	Val	Ala	Thr	
	210					215					220					
	cca	ggt	gtg	act	att	aat	aat	act	tcc	ttg	caa	act	aaa	gtt	act	7
20 Gly	Pro	Gly	Val	Thr	Ile	Asn	Asn	Thr	Ser	Leu	Gln	Thr	Lys	Val	Thr	
225					230					235					240	
gga 68	gcc	ttg	ggt	ttt	gat	tca	caa	ggc	aat	atg	caa	ctt	aat	gta	gca	7
	Ala	Leu	Gly	Phe	Asp	Ser	Gln	Gly	Asn	Met	Gln	Leu	Asn	Val	Ala	
				245					250					255		
	gga	cta	agg	att	gat	tct	caa	aac	aga	cgc	ctt	ata	ctt	gat	gtt	8
16 Gly	Gly	Leu	Arg	Ile	Asp	Ser	Gln	Asn	Arg	Arg	Leu	Ile	Leu	Asp	Val	
			260					265					270			
	tat	ccg	ttt	gat	gct	caa	aac	caa	cta	aat	cta	aga	cta	gga	cag	8
64 Ser	Tyr	Pro	Phe	Asp	Ala	Gln	Asn	Gln	Leu	Asn	Leu	Arg	Leu	Gly	Gln	
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ggc 12	cct	ctt	ttt	ata	aac	tca	gcc	cac	aac	ttg	gat	att	aac	tac	aac	9
	Pro	Leu	Phe	Ile	Asn	Ser	Ala	His	Asn	Leu	Asp	Ile	Asn	Tyr	Asn	
	290					295					300					
60	ggc			_			-						_		5 5	9
Lys	Gly	Leu	Tyr	Leu	Phe	Thr	Ala	Ser	Asn	Asn	Ser	Lys	Lys	Leu	Glu	
305					310					315					320	
att	aac	cta	adc	act	acc	aad	aaa	tta	ata	+++	gac	act	aca	acc	ata	10
80												_		_		10
vaı	Asn	Leu	ser		Ala	Lys	GIY	Leu	Met	Phe	Asp	Ala	Thr	Ala	lle	
				325					330					335		
qcc	att	aat	qca	qqa	gat	aaa	ctt	gaa	ttt	aat	tca	cct	aat	gca	cca	10
56	Ile		_		_			_						_		
	110	11011	340	O ₁	- ILD	O.J	Dea		1110	OLY	DCI	110		ALG	110	
			340					345					350			
	aca	aat	ccc	ctc	aaa	aca	aaa	att	ggc	cat	ggc	cta	gaa	ttt	gat	11
04 Asn	Thr	Asn	Pro	Leu	Lys	Thr	Lys	Ile	Gly	His	Gly	Leu	Glu	Phe	Asp	
		355					360					365				
tca 52	aac	aag	gct	atg	gtt	cct	aaa	cta	gga	act	ggc	ctt	agt	ttt	gac	11
	Asn	Lys	Ala	Met	Val	Pro	Lys	Leu	Gly	Thr	Gly	Leu	Ser	Phe	Asp	
	370					375					380					
00	aca		_			_						_	_			12
Ser	Thr	Gly	Ala	Ile	Thr	Val	Gly	Asn	Lys	Asn	Asn	Asp	Lys	Leu	Thr	

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ttg 48	tgg	acc	aca	сса	gct	cca	tct	cct	aac	tgt	aga	cta	aat	gca	gag	12
Leu	Trp	Thr	Thr	Pro	Ala	Pro	Ser	Pro	Asn	Cys	Arg	Leu	Asn	Ala	Glu	
				405					410					415		
aaa 96	gat	gct	aaa	ctc	act	ttg	gtc	tta	aca	aaa	tgt	ggc	agt	caa	ata	12
Lys	Asp	Ala	Lys	Leu	Thr	Leu	Val	Leu	Thr	Lys	Cys	Gly	Ser	Gln	Ile	
			420					425					430			
ctt 44	gct	aca	gtt	tca	gtt	ttg	gct	aaa	ggc	agt	ttg	gct	cca	ata	tct	13
Leu	Ala	Thr	Val	Ser	Val	Leu	Ala	Lys	Gly	Ser	Leu	Ala	Pro	Ile	Ser	
		435					440					445				
gga 92	aca	gtt	caa	agt	gct	cat	ctt	att	ata	aga	ttt	gac	gaa	aat	gga	13
Gly	Thr	Val	Gln	Ser	Ala	His	Leu	Ile	Ile	Arg	Phe	Asp	Glu	Asn	Gly	
	450					455					460					
gtg 40	cta	cta	aac	aat	tcc	ttc	ctg	gac	cca	gaa	tat	tgg	aac	ttt	aga	14
Val	Leu	Leu	Asn	Asn	Ser	Phe	Leu	Asp	Pro	Glu	Tyr	Trp	Asn	Phe	Arg	
465					470					475					480	
aat 88	gga	gat	ctt	act	gaa	ggc	aca	gcc	tat	aca	aac	gct	gtt	gga	ttt	14
Asn	Gly	Asp	Leu	Thr	Glu	Gly	Thr	Ala	Tyr	Thr	Asn	Ala	Val	Gly	Phe	
				485					490					495		
atg 36	cct	aac	cta	tca	gct	tat	cca	aaa	tct	cac	ggt	aaa	act	gcc	aaa	15
	Pro	Asn	Leu	Ser	Ala	Tyr	Pro	Lys	Ser	His	Gly	Lys	Thr	Ala	Lys	
								Page	41							

510

500

agt 84	aac	att	gtc	agt	caa	gtt	tac	tta	aac	gga	gac	aaa	act	aaa	cct	15
	Asn	Ile	Val	Ser	Gln	Val	Tyr	Leu	Asn	Gly	Asp	Lys	Thr	Lys	Pro	
		515					520					525				
gta 32	aca	cta	acc	att	aca	cta	aac	ggt	aca	cag	gaa	aca	gga	gac	aca	16
Val	Thr	Leu	Thr	Ile	Thr	Leu	Asn	Gly	Thr	Gln	Glu	Thr	Gly	Asp	Thr	
	530					535					540					
	cca	agt	gca	tac	tct	atg	tca	ttt	tca	tgg	gac	tgg	tct	ggc	cac	16
80 Thr	Pro	Ser	Ala	Tyr	Ser	Met	Ser	Phe	Ser	Trp	Asp	Trp	Ser	Gly	His	
545					550					555					560	
aac 28	tac	att	aat	gaa	ata	ttt	gcc	aca	tcc	tct	tac	act	ttt	tca	tac	17
	Tyr	Ile	Asn	Glu	Ile	Phe	Ala	Thr	Ser	Ser	Tyr	Thr	Phe	Ser	Tyr	
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att 43	gcc	caa	gaa	taa												17
Ile	Ala	Gln	Glu													
			580													
<210 <211 <212 <213	L> 2>	10 580 PRT Artii	ficia	al												
<400	)>	10														

Met Lys Arg Ala Arg Pro Ser Glu Asp Thr Phe Asn Pro Val Tyr Pro  $$\operatorname{\tt Page}$\ 42$ 

DONTONOU . DONTON

Phe Val Ser Pro Asn Gly Phe Gln Glu Ser Pro Pro Gly Val Leu Ser 35 40 45

Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu 50 55 60

Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser 65 70 75 80

Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn 85 90 95

Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu  $100 \hspace{1.5cm} 105 \hspace{1.5cm} 110 \hspace{1.5cm}$ 

Thr Val Ala Ala Ala Ala Pro Leu Met Val Ala Gly Asn Thr Leu Thr 115 \$120\$ 125

Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile 130 135 140

Ala Thr Gln Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Ala Leu Gln 145 150 155 160

Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr 165 170 175

Lys Glu Pro Ile Tyr Thr Gln Asn Gly Lys Leu Gly Leu Lys Tyr Gly Page 43

Ala Pro Leu His Val Thr Asp Asp Leu Asn Thr Leu Thr Val Ala Thr 210  $\phantom{\bigg|}215\phantom{\bigg|}$  220

Gly Pro Gly Val Thr Ile Asn Asn Thr Ser Leu Gln Thr Lys Val Thr 225 230 235 240

Gly Ala Leu Gly Phe Asp Ser Gln Gly Asn Met Gln Leu Asn Val Ala  $245 \hspace{1.5cm} 250 \hspace{1.5cm} 255$ 

Gly Gly Leu Arg Ile Asp Ser Gln Asn Arg Arg Leu Ile Leu Asp Val  $\phantom{\bigg|}260\phantom{\bigg|}265\phantom{\bigg|}265\phantom{\bigg|}$ 

Ser Tyr Pro Phe Asp Ala Gln Asn Gln Leu Asn Leu Arg Leu Gly Gln 275 280 285

Gly Pro Leu Phe Ile Asn Ser Ala His Asn Leu Asp Ile Asn Tyr Asn 290 295 300

Lys Gly Leu Tyr Leu Phe Thr Ala Ser Asn Asn Ser Lys Lys Leu Glu 305 310 310 320

Val Asn Leu Ser Thr Ala Lys Gly Leu Met Phe Asp Ala Thr Ala Ile 325  $\phantom{\bigg|}$  330  $\phantom{\bigg|}$  335

Ala Ile Asn Ala Gly Asp Gly Leu Glu Phe Gly Ser Pro Asn Ala Pro 340 345 350

Asn Thr Asn Pro Leu Lys Thr Lys Ile Gly His Gly Leu Glu Phe Asp \$355\$

Ser Asn Lys Ala Met Val Pro Lys Leu Gly Thr Gly Leu Ser Phe Asp  $370 \hspace{1.5cm} 375 \hspace{1.5cm} 380 \hspace{1.5cm}$ 

Ser Thr Gly Ala Ile Thr Val Gly Asn Lys Asn Asn Asp Lys Leu Thr  ${\tt Page} \ 44$ 

DOSFOROS OSBOOL

Leu	Trp	Thr	Thr	Pro	Ala	Pro	Ser	Pro	Asn	Cys	Arg	Leu	Asn	Ala	Glu
				405					410					415	

Lys Asp Ala Lys Leu Thr Leu Val Leu Thr Lys Cys Gly Ser Gln Ile \$420\$ \$425\$ \$430

Leu Ala Thr Val Ser Val Leu Ala Lys Gly Ser Leu Ala Pro Ile Ser  $435 \hspace{1.5cm} 440 \hspace{1.5cm} 445$ 

Val Leu Leu Asn Asn Ser Phe Leu Asp Pro Glu Tyr Trp Asn Phe Arg 465 470 480

Asn Gly Asp Leu Thr Glu Gly Thr Ala Tyr Thr Asn Ala Val Gly Phe \$485\$

Met Pro Asn Leu Ser Ala Tyr Pro Lys Ser His Gly Lys Thr Ala Lys 500 505 510

Val Thr Leu Thr Ile Thr Leu Asn Gly Thr Gln Glu Thr Gly Asp Thr 530 535 540

Thr Pro Ser Ala Tyr Ser Met Ser Phe Ser Trp Asp Trp Ser Gly His 545 550 555 560

Asn Tyr Ile Asn Glu Ile Phe Ala Thr Ser Ser Tyr Thr Phe Ser Tyr 565 570 575

Ile Ala Gln Glu

<210> 11 <211> 1743 <212> DNA <213> Artificial <220> <223> Codes for a mutated Human Adenovirus type 5 fiber protein. le otides corresponding to amino acid 442(K) of wild-type fiber wa deleted <220> <221> CDS (1)..(1743) <222> <400> 11 atq aaq cqc qca aqa ccq tct qaa qat acc ttc aac ccc gtg tat cca Met Lys Arg Ala Arg Pro Ser Glu Asp Thr Phe Asn Pro Val Tyr Pro 5 10 15 1 tat qac acq qaa acc qqt cct cca act qtq cct ttt ctt act cct ccc Tyr Asp Thr Glu Thr Gly Pro Pro Thr Val Pro Phe Leu Thr Pro Pro 20 25 30 ttt gta tcc ccc aat ggg ttt caa gag agt ccc cct ggg gta ctc tct Phe Val Ser Pro Asn Gly Phe Gln Glu Ser Pro Pro Gly Val Leu Ser

35 40 45

ttg cgc cta tcc gaa cct cta gtt acc tcc aat ggc atg ctt gcg ctc Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu 50 55 60

1

1

#### 4-31452A.ST25.txt aaa atg ggc aac ggc ctc tct ctg gac gag gcc ggc aac ctt acc tcc Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser caa aat gta acc act gtg agc cca cct ctc aaa aaa acc aag tca aac Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn ata aac ctg gaa ata tct gca ccc ctc aca gtt acc tca gaa gcc cta Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu act qtq qct qcc qcc gca cct cta atg gtc gcg ggc aac aca ctc acc Thr Val Ala Ala Ala Pro Leu Met Val Ala Gly Asn Thr Leu Thr atq caa tca caq qcc ccq cta acc qtg cac qac tcc aaa ctt aqc att Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile qcc acc caa qqa ccc ctc aca qtq tca qaa qqa aaq cta qcc ctq caa

145 150 155 160

aca tca ggc ccc ctc acc acc gat agc agt acc ctt act atc act 28

Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr

Ala Thr Gln Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Ala Leu Gln

165 170 175

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76							_			_	_			gac	_	5
Ala	Ser	Pro	Pro	Leu	Thr	Thr	Ala	Thr	Gly	Ser	Leu	Gly	Ile	Asp	Leu	
			180					185					190			
aaa 24	gag	ccc	att	tat	aca	caa	aat	gga	aaa	cta	gga	cta	aag	tac	aaa	6
Lys	Glu	Pro	Ile	Tyr	Thr	Gln	Asn	Gly	Lys	Leu	Gly	Leu	Lys	Tyr	Gly	
		195					200					205				
gct 72	cct	ttg	cat	gta	aca	gac	gac	cta	aac	act	ttg	acc	gta	gca	act	6
Ala	Pro	Leu	His	Val	Thr	Asp	Asp	Leu	Asn	Thr	Leu	Thr	Val	Ala	Thr	
	210					215					220					
	cca	ggt	gtg	act	att	aat	aat	act	tcc	ttg	caa	act	aaa	gtt	act	7
20 Gly	Pro	Gly	Val	Thr	Ile	Asn	Asn	Thr	Ser	Leu	Gln	Thr	Lys	Val	Thr	
225					230					235					240	
gga 68	gcc	ttg	ggt	ttt	gat	tca	caa	ggc	aat	atg	caa	ctt	aat	gta	gca	7
	Ala	Leu	Gly	Phe	Asp	Ser	Gln	Gly	Asn	Met	Gln	Leu	Asn	Val	Ala	
				245					250					255		
gga 16	gga	cta	agg	att	gat	tct	caa	aac	aga	cgc	ctt	ata	ctt	gat	gtt	8
	Gly	Leu	Arg	Ile	Asp	Ser	Gln	Asn	Arg	Arg	Leu	Ile	Leu	Asp	Val	
			260					265					270			
agt 64	tat	ccg	ttt	gat	gct	caa	aac	caa	cta	aat	cta	aga	cta	gga	cag	8
	Tyr	Pro	Phe	Asp	Ala	Gln	Asn	Gln	Leu	Asn	Leu	Arg	Leu	Gly	Gln	
		275					280					285				

ggc 12	cct	ctt	ttt	ata	aac	tca	gcc	cac	aac	ttg	gat	att	aac	tac	aac		9
	Pro	Leu	Phe	Ile	Asn	Ser	Ala	His	Asn	Leu	Asp	Ile	Asn	Tyr	Asn		
	290					295					300						
aaa 60	ggc	ctt	tac	ttg	ttt	aca	gct	tca	aac	aat	tcc	aaa	aag	ctt	gag		9
Lys	Gly	Leu	Tyr	Leu	Phe	Thr	Ala	Ser	Asn	Asn	Ser	Lys	Lys	Leu	Glu		
305					310					315					320		
																_	
gtt 08	aac	cta	agc	act	gcc	aag	999	ttg	atg	ttt	gac	gct	aca	gcc	ata	1	0
Val	Asn	Leu	Ser	Thr	Ala	Lys	Gly	Leu	Met	Phe	Asp	Ala	Thr	Ala	Ile		
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Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser 65 70 75 80

Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn 85 90 95

Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu 100 105 110

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Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile 130 135 140

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Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr 165  $\phantom{\bigg|}$  170  $\phantom{\bigg|}$  175

Ala Ser Pro Pro Leu Thr Thr Ala Thr Gly Ser Leu Gly Ile Asp Leu 180 185 190

Lys Glu Pro Ile Tyr Thr Gln Asn Gly Lys Leu Gly Leu Lys Tyr Gly
Page 52

Ala Pro Leu His Val Thr Asp Asp Leu Asn Thr Leu Thr Val Ala Thr 210 220

Gly Pro Gly Val Thr Ile Asn Asn Thr Ser Leu Gln Thr Lys Val Thr 225  $\phantom{\bigg|}230\phantom{\bigg|}230\phantom{\bigg|}235\phantom{\bigg|}$ 

Gly Ala Leu Gly Phe Asp Ser Gln Gly Asn Met Gln Leu Asn Val Ala 245 250 255

Gly Gly Leu Arg Ile Asp Ser Gln Asn Arg Arg Leu Ile Leu Asp Val 260 265 270

Ser Tyr Pro Phe Asp Ala Gln Asn Gln Leu Asn Leu Arg Leu Gly Gln 275 280 285

Gly Pro Leu Phe Ile Asn Ser Ala His Asn Leu Asp Ile Asn Tyr Asn 290  $\,$  295  $\,$  300  $\,$ 

Lys Gly Leu Tyr Leu Phe Thr Ala Ser Asn Asn Ser Lys Lys Leu Glu 305  $\phantom{\bigg|}$  310  $\phantom{\bigg|}$  315  $\phantom{\bigg|}$  320

Val Asn Leu Ser Thr Ala Lys Gly Leu Met Phe Asp Ala Thr Ala Ile 325  $\phantom{\bigg|}330\phantom{\bigg|}335\phantom{\bigg|}$ 

Ala Ile Asn Ala Gly Asp Gly Leu Glu Phe Gly Ser Pro Asn Ala Pro 340 345 350

Asn Thr Asn Pro Leu Lys Thr Lys Ile Gly His Gly Leu Glu Phe Asp \$355\$

Ser Asn Lys Ala Met Val Pro Lys Leu Gly Thr Gly Leu Ser Phe Asp 370 375 380

Ser Thr Gly Ala Ile Thr Val Gly Asn Lys Asn Asn Asp Lys Leu Thr  ${\tt Page \ 53}$ 

Leu Trp Thr Thr Pro Ala Pro Ser Pro Asn Cys Arg Leu Asn Ala Glu 405  $\phantom{0}410$   $\phantom{0}415$ 

Lys Asp Ala Lys Leu Thr Leu Val Leu Thr Lys Cys Gly Ser Gln Ile \$420\$

Leu Ala Thr Val Ser Val Leu Ala Val Gly Ser Leu Ala Pro Ile Ser  $435 \hspace{1.5cm} 440 \hspace{1.5cm} 445 \hspace{1.5cm}$ 

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Met Pro Asn Leu Ser Ala Tyr Pro Lys Ser His Gly Lys Thr Ala Lys 500 505 510

Ser Asn Ile Val Ser Gln Val Tyr Leu Asn Gly Asp Lys Thr Lys Pro 515 520 525

Val Thr Leu Thr Ile Thr Leu Asn Gly Thr Gln Glu Thr Gly Asp Thr 530 535 540

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Page 57

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	Thr	Asn	Pro	Leu	Lys	Thr	Lys	Ile	Gly	His	Gly	Leu	Glu	Phe	Asp		
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Phe Met Pro Asn Leu Ser Ala Tyr Pro Lys Ser His Gly Lys Thr Ala Page 59

510

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Met Lys Arg Ala Arg Pro Ser Glu Asp Thr Phe Asn Pro Val Tyr Pro Page 60

DUBY DECS. DS 3DG1

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Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu 

Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser 

Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn 

Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu 

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Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile 

Ala Thr Gln Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Ala Leu Gln 

Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr 

Ala Ser Pro Pro Leu Thr Thr Ala Thr Gly Ser Leu Gly Ile Asp Leu 

Lys Glu Pro Ile Tyr Thr Gln Asn Gly Lys Leu Gly Leu Lys Tyr Gly Page 61

Ala Pro Leu His Val Thr Asp Asp Leu Asn Thr Leu Thr Val Ala Thr 210 215 220

Gly Pro Gly Val Thr Ile Asn Asn Thr Ser Leu Gln Thr Lys Val Thr 225 230 235 240

Gly Gly Leu Arg Ile Asp Ser Gln Asn Arg Arg Leu Ile Leu Asp Val\$260\$ 265 \$270\$

Ser Tyr Pro Phe Asp Ala Gln Asn Gln Leu Asn Leu Arg Leu Gly Gln 275 280 285

Gly Pro Leu Phe Ile Asn Ser Ala His Asn Leu Asp Ile Asn Tyr Asn 290 295 300

Lys Gly Leu Tyr Leu Phe Thr Ala Ser Asn Asn Ser Lys Lys Leu Glu 305  $\phantom{\bigg|}$  310  $\phantom{\bigg|}$  315  $\phantom{\bigg|}$  320

Val Asn Leu Ser Thr Ala Lys Gly Leu Met Phe Asp Ala Thr Ala Ile 325  $\phantom{\bigg|}330\phantom{\bigg|}330\phantom{\bigg|}$ 

Ala Ile Asn Ala Gly Asp Gly Leu Glu Phe Gly Ser Pro Asn Ala Pro 340 345 350

Ser Thr Gly Ala Ile Thr Val Gly Asn Lys Asn Asn Asp Lys Leu Thr Page 62

Leu Trp Thr Thr Pro Ala Pro Ser Pro Asn Cys Arg Leu Asn Ala Glu 405 410 415

390

Lys Asp Ala Lys Leu Thr Leu Val Leu Thr Lys Cys Gly Ser Gln Ile  $420 \hspace{1.5cm} 425 \hspace{1.5cm} 430$ 

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Phe Val Ser Pro Asn Gly Phe Gln Glu Ser Pro Pro Gly Val Leu Ser

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165 170 175

Page 65

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Ser	Tyr	Pro	Phe	Asp	Ala	Gln	Asn	Gln	Leu	Asn	Leu	Arg	Leu	Gly	Gln	
		275					280					285				

Page 66

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	Pro	Leu	Phe	Ile	Asn	Ser	Ala	His	Asn	Leu	Asp	Ile	Asn	Tyr	Asn		
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	Gly	Leu	Tyr	Leu	Phe	Thr	Ala	Ser	Asn	Asn	Ser	Lys	Lys	Leu	Glu		
305					310					315					320		
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Val	Asn	Leu	Ser	Thr	Ala	Lys	Gly	Leu	Met	Phe	Asp	Ala	Thr	Ala	Ile		
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	Ile	Asn	Ala	Gly	Asp	Gly	Leu	Glu	Phe	Gly	Ser	Pro	Asn	Ala	Pro		
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	Thr	Asn	Pro	Leu	Lys	Thr	Lys	Ile	Gly	His	Gly	Leu	Glu	Phe	Asp		
		355					360					365					
tca 52	aac	aag	gct	atg	gtt	cct	aaa	cta	gga	act	ggc	ctt	agt	ttt	gac	11	
Ser	Asn	Lys	Ala	Met	Val	Pro	Lys	Leu	Gly	Thr	Gly	Leu	Ser	Phe	Asp		
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4-31452A.ST25.txt 385 390 395 400

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	Asp	Ala	Lys	Leu	Thr	Leu	Val	Leu	Thr	Lys	Cys	Gly	Ser	Gln	Ile	
			420					425					430			
ctt 44	gct	aca	gtt	tca	gtt	ttg	gct	gtt	aaa	ggc	agt	ttg	gct	cca	ata	13
	Ala	Thr	Val	Ser	Val	Leu	Ala	Val	Lys	Gly	Ser	Leu	Ala	Pro	Ile	
		435					440					445				
tct 92	gga	aca	gtt	caa	agt	gct	cat	ctt	att	ata	gaa	ttc	gac	gaa	aat	13
Ser	Gly	Thr	Val	Gln	Ser	Ala	His	Leu	Ile	Ile	Glu	Phe	Asp	Glu	Asn	
	450					455					460					
gga 40	gtg	cta	cta	aac	aat	tcc	ttc	ctg	gac	cca	gaa	tat	tgg	aac	ttt	14
Gly	Val	Leu	Leu	Asn	Asn	Ser	Phe	Leu	Asp	Pro	Glu	Tyr	Trp	Asn	Phe	
465					470					475					480	
																14
88	aat		_			_			_							TA
Arg	Asn	Gly	Asp	Leu	Thr	Glu	Gly	Thr	Ala	Tyr	Thr	Asn	Ala	Val	Gly	
				485					490					495		
	2+5	aat	225	at a	+ 00	aat	+ - +	995	222	+ a+	G2.C	aat	222	a c+	acc	15
36	atg					_									_	10
Phe	Met	Pro	Asn	Leu	Ser	Ala	Tyr	Pro	Lys	Ser	His	Gly	Lys	Thr	A⊥a	

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			500					505					510			
aaa 84	agt	aac	att	gtc	agt	caa	gtt	tac	tta	aac	gga	gac	aaa	act	aaa	15
	Ser	Asn	Ile	Val	Ser	Gln	Val	Tyr	Leu	Asn	Gly	Asp	Lys	Thr	Lys	
		515					520					525				
cct	ata	aca	cta	acc	att	aca	cta	aac	aat.	aca	caq	gaa	aca	aaa	gac	16
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Pro		Thr	Leu	THE	TTE		Leu	ASII	GLY	THE		GIU	TIIT	GIY	Asp	
	530					535					540					
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80 Thr	Thr	Pro	Ser	Ala	Tyr	Ser	Met	Ser	Phe	Ser	Trp	Asp	Trp	Ser	Gly	
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His	Asn	Tyr	Ile	Asn	Glu	Ile	Phe	Ala	Thr	Ser	Ser	Tyr	Thr	Phe	Ser	
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tac	att	gcc	caa	gaa	taa											17
46 Tyr	Ile	Ala	Gln	Glu												
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Met Lys Arg Ala Arg Pro Ser Glu Asp Thr Phe Asn Pro Val Tyr Pro Page 69

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Phe Val Ser Pro Asn Gly Phe Gln Glu Ser Pro Pro Gly Val Leu Ser 35 40 45

Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu 50 60

Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser 65 70 75 80

Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn 85 90 95

Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu 100 105 110

Thr Val Ala Ala Ala Ala Pro Leu Met Val Ala Gly Asn Thr Leu Thr 115  $$\rm 120$  125

Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile 130  $$140\$ 

Ala Thr Gln Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Ala Leu Gln 145 150 155 160

Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr 165 170 175

Ala Ser Pro Pro Leu Thr Thr Ala Thr Gly Ser Leu Gly Ile Asp Leu 180 185 190

Lys Glu Pro Ile Tyr Thr Gln Asn Gly Lys Leu Gly Leu Lys Tyr Gly Page 70 Ala Pro Leu His Val Thr Asp Asp Leu Asn Thr Leu Thr Val Ala Thr 210  $\,$  215  $\,$  220  $\,$ 

Gly Pro Gly Val Thr Ile Asn Asn Thr Ser Leu Gln Thr Lys Val Thr 225 230 235 240

Gly Ala Leu Gly Phe Asp Ser Gln Gly Asn Met Gln Leu Asn Val Ala  $245 \hspace{1.5cm} 250 \hspace{1.5cm} 255$ 

Gly Gly Leu Arg Ile Asp Ser Gln Asn Arg Arg Leu Ile Leu Asp Val\$260\$ 265 \$270\$

Ser Tyr Pro Phe Asp Ala Gln Asn Gln Leu Asn Leu Arg Leu Gly Gln 275 280 285

Gly Pro Leu Phe Ile Asn Ser Ala His Asn Leu Asp Ile Asn Tyr Asn 290 295 300

Lys Gly Leu Tyr Leu Phe Thr Ala Ser Asn Asn Ser Lys Lys Leu Glu 305 310 315 320

Val Asn Leu Ser Thr Ala Lys Gly Leu Met Phe Asp Ala Thr Ala Ile 325 330 335

Ala Ile Asn Ala Gly Asp Gly Leu Glu Phe Gly Ser Pro Asn Ala Pro 340 345 350

Asn Thr Asn Pro Leu Lys Thr Lys Ile Gly His Gly Leu Glu Phe Asp  $355 \\ 860 \\ 360$ 

Ser Asn Lys Ala Met Val Pro Lys Leu Gly Thr Gly Leu Ser Phe Asp 370 375 380

Ser Thr Gly Ala Ile Thr Val Gly Asn Lys Asn Asn Asp Lys Leu Thr  ${\tt Page~71}$ 

TOUTED' EDZOZBED

Leu	Trp	Thr	Thr	Pro 405	Ala	Pro	Ser	Pro	Asn 410	Cys	Arg	Leu	Asn	Ala 415	Glu
Lys	Asp	Ala	Lys 420	Leu	Thr	Leu	Val	Leu 425	Thr	Lys	Cys	Gly	Ser 430	Gln	Ile
Leu	Ala	Thr 435	Val	Ser	Val	Leu	Ala 440	Val	Lys	Gly	Ser	Leu 445	Ala	Pro	Ile
Ser	Gly 450	Thr	Val	Gln	Ser	Ala 455	His	Leu	Ile	Ile	Glu 460	Phe	Asp	Glu	Asn
Gly 465	Val	Leu	Leu	Asn	Asn 470	Ser	Phe	Leu	Asp	Pro 475	Glu	Tyr	Trp	Asn	Phe 480
Arg	Asn	Gly	Asp	Leu 485	Thr	Glu	Gly	Thr	Ala 490	Tyr	Thr	Asn	Ala	Val 495	Gly
Phe	Met	Pro	Asn 500	Leu	Ser	Ala	Tyr	Pro 505	Lys	Ser	His	Gly	Lys 510	Thr	Ala
Lys	Ser	Asn 515	Ile	Val	Ser	Gln	Val 520	Tyr	Leu	Asn	Gly	Asp 525	Lys	Thr	Lys
Pro	Val 530	Thr	Leu	Thr	Ile	Thr 535	Leu	Asn	Gly	Thr	Gln 540	Glu	Thr	Gly	Asp
Thr 545	Thr	Pro	Ser	Ala	Tyr 550	Ser	Met	Ser	Phe	Ser 555	Trp	Asp	Trp	Ser	Gly 560
His	Asn	Tyr	Ile	Asn	Glu	Ile	Phe	Ala	Thr	Ser	Ser	Tyr	Thr	Phe	Ser

Tyr Ile Ala Gln Glu

580

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Artificial <213>

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Codes for a mutated Human Adenovirus type 5 fiber protein. Nuc <223> le otides corresponding to amino acids 509(G) & 510(K) of wild-typ

fiber were deleted

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ttt gta tcc ccc aat ggg ttt caa gag agt ccc cct ggg gta ctc tct Phe Val Ser Pro Asn Gly Phe Gln Glu Ser Pro Pro Gly Val Leu Ser

1

1

40 45 35

ttg cgc cta tcc gaa cct cta gtt acc tcc aat ggc atg ctt gcg ctc Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu

50 55 60

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gcc 76	tca	ccc	cct	cta	act	act	gcc	act	ggt	agc	ttg	ggc	att	gac	ttg	5
Ala	Ser	Pro	Pro	Leu	Thr	Thr	Ala	Thr	Gly	Ser	Leu	Gly	Ile	Asp	Leu	
			180					185					190			
aaa 24	gag	ccc	att	tat	aca	caa	aat	gga	aaa	cta	gga	cta	aag	tac	<b>a</b> aa	6
Lys	Glu	Pro	Ile	Tyr	Thr	Gln	Asn	Gly	Lys	Leu	Gly	Leu	Lys	Tyr	Gly	
		195					200					205				
															- ~ 4	6
72											ttg					0
Ala	Pro	Leu	His	Val	Thr	Asp	Asp	Leu	Asn	Thr	Leu	Thr	Val	Ala	Thr	
	210					215					220					
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2.0											caa					7
Gly	Pro	Gly	Val	Thr	Ile	Asn	Asn	Thr	Ser	Leu	Gln	Thr	Lys	Val	Thr	
225					230					235					240	
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gga 68	gcc	ttg	ggt	ttt	gat	tca	caa	ggc	aat	atg	caa	ctt	aat	gta	gca	7
Gly	Ala	Leu	Gly	Phe	Asp	Ser	Gln	Gly	Asn	Met	Gln	Leu	Asn	Val	Ala	
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gga 16	gga	cta	agg	att	gat	tct	caa	aac	aga	cgc	ctt	ata	ctt	gat	gtt	8
Gly	Gly	Leu	Arg	Ile	Asp	Ser	Gln	. Asn	Arg	Arg	Leu	Ile	Leu	Asp	Val	
			260					265					270			
agt	tat	ccg	ttt	gat	gct	caa	aac	caa	cta	aat	cta	aga	cta	. gga	cag	
Ser	Tyr	Pro	Phe	Asp	Ala	Glr	Asr.	Gln	Leu	Asr	Leu	Arg	Leu	Gly	Gln	
		275	•				280					285				

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	290					295					300					
aaa 60	ggc	ctt	tac	ttg	ttt	aca	gct	tca	aac	aat	tcc	aaa	aag	ctt	gag	9
Lys	Gly	Leu	Tyr	Leu	Phe	Thr	Ala	Ser	Asn	Asn	Ser	Lys	Lys	Leu	Glu	
305					310					315					320	
				a a t	~~~	229	aaa	tta	ata	+++	gac	act	aca	acc	ata	10
0.8																
Val	Asn	Leu	Ser	Thr	Ala	Lys	Gly	Leu	Met	Phe	Asp	Ala	Thr		TTE	
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													22+	~~~	993	10
56											tca					10
Ala	Ile	Asn	Ala	Gly	Asp	Gly	Leu	Glu	Phe	Gly	Ser	Pro	Asn	Ala	Pro	
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									~~~	ant	aaa	ata	an n	+++	ast	11
04											ggc					
Asn	Thr	Asn	Pro	Leu	Lys	Thr	Lys	Ile	Gly	His	Gly	Leu	Glu	Phe	Asp	
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+ 00	220	220	aat	ato	att	cct	222	cta	aaa	act	ggc	ctt	agt.	ttt	gac	11
52																
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	370					375					380					
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Sel	1111	GIY	лта	. 116	1111	val	OLY	11011					_, _			

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36

4-31452A.ST25.txt 385 390 395 400

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Phe Met Pro Asn Leu Ser Ala Tyr Pro Lys Ser His Thr Ala Lys Ser Page 77

510

aac att gtc agt caa gtt tac tta aac gga gac aaa act aaa cct gta 15 Asn Ile Val Ser Gln Val Tyr Leu Asn Gly Asp Lys Thr Lys Pro Val 525 520 515 aca cta acc att aca cta aac ggt aca cag gaa aca gga gac aca act 16 Thr Leu Thr Ile Thr Leu Asn Gly Thr Gln Glu Thr Gly Asp Thr Thr 540 535 530 cca agt gca tac tct atg tca ttt tca tgg gac tgg tct ggc cac aac 16 Pro Ser Ala Tyr Ser Met Ser Phe Ser Trp Asp Trp Ser Gly His Asn 560 555 550 545 tac att aat gaa ata ttt gcc aca tcc tct tac act ttt tca tac att 17 Tyr Ile Asn Glu Ile Phe Ala Thr Ser Ser Tyr Thr Phe Ser Tyr Ile 575 570 565 17 qcc caa gaa taa 40 Ala Gln Glu

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<211> 579

<212> PRT

<213> Artificial

500

<400> 18

Met Lys Arg Ala Arg Pro Ser Glu Asp Thr Phe Asn Pro Val Tyr Pro Page 78 1

Tyr Asp Thr Glu Thr Gly Pro Pro Thr Val Pro Phe Leu Thr Pro Pro $20 \ \ 25 \ \ 30$

Phe Val Ser Pro Asn Gly Phe Gln Glu Ser Pro Pro Gly Val Leu Ser 35 40 45

Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu 50 60

Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser 65 70 75 80

Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn 85 90 90

Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu 100 $\,$ 105 $\,$ 110 $\,$

Thr Val Ala Ala Ala Ala Pro Leu Met Val Ala Gly Asn Thr Leu Thr 115 $$120\$

Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile 130 135 140

Ala Thr Gln Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Ala Leu Gln 145 $$ 150 $$ 155 $$ 160

Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr 165 $$170\$

Ala Ser Pro Pro Leu Thr Thr Ala Thr Gly Ser Leu Gly Ile Asp Leu 180 185 190

Lys Glu Pro Ile Tyr Thr Gln Asn Gly Lys Leu Gly Leu Lys Tyr Gly Page 79

Gly Pro Gly Val Thr Ile Asn Asn Thr Ser Leu Gln Thr Lys Val Thr 225 230 240

Gly Gly Leu Arg Ile Asp Ser Gln Asn Arg Arg Leu Ile Leu Asp Val $_{\rm 260}$

Ser Tyr Pro Phe Asp Ala Gln Asn Gln Leu Asn Leu Arg Leu Gly Gln 275 280 285

Gly Pro Leu Phe Ile Asn Ser Ala His Asn Leu Asp Ile Asn Tyr Asn 290 $$ 300 $$

Lys Gly Leu Tyr Leu Phe Thr Ala Ser Asn Asn Ser Lys Lys Leu Glu 305 310310315

Val Asn Leu Ser Thr Ala Lys Gly Leu Met Phe Asp Ala Thr Ala Ile 325 \$330\$

Ala Ile Asn Ala Gly Asp Gly Leu Glu Phe Gly Ser Pro Asn Ala Pro $340 \hspace{1.5cm} 345 \hspace{1.5cm} 350 \hspace{1.5cm}$

Asn Thr Asn Pro Leu Lys Thr Lys Ile Gly His Gly Leu Glu Phe Asp 355 360 365

Ser Asn Lys Ala Met Val Pro Lys Leu Gly Thr Gly Leu Ser Phe Asp 370 380

Ser Thr Gly Ala Ile Thr Val Gly Asn Lys Asn Asn Asp Lys Leu Thr Page 80 (3)

COMOZEG

05300

int

Leu Trp Thr Thr Pro Ala Pro Ser Pro Asn Cys Arg Leu Asn Ala Glu 405 410 415

Lys Asp Ala Lys Leu Thr Leu Val Leu Thr Lys Cys Gly Ser Gln Ile $420 \hspace{1.5cm} 425 \hspace{1.5cm} 430$

Leu Ala Thr Val Ser Val Leu Ala Val Lys Gly Ser Leu Ala Pro Ile 435 440 445

Ser Gly Thr Val Gln Ser Ala His Leu Ile Ile Arg Phe Asp Glu Asn $450 \hspace{1.5cm} 455 \hspace{1.5cm} 460 \hspace{1.5cm}$

Gly Val Leu Leu Asn Asn Ser Phe Leu Asp Pro Glu Tyr Trp Asn Phe 465 470 475 480

Arg Asn Gly Asp Leu Thr Glu Gly Thr Ala Tyr Thr Asn Ala Val Gly 485 490 495

Phe Met Pro Asn Leu Ser Ala Tyr Pro Lys Ser His Thr Ala Lys Ser 500 510

Asn Ile Val Ser Gln Val Tyr Leu Asn Gly Asp Lys Thr Lys Pro Val 515 520 525

Pro Ser Ala Tyr Ser Met Ser Phe Ser Trp Asp Trp Ser Gly His Asn 545 550 560

Tyr Ile Asn Glu Ile Phe Ala Thr Ser Ser Tyr Thr Phe Ser Tyr Ile 565 570 575

Ala Gln Glu

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4-31452A ST25 txt

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caa 88	aat	gta	acc	act	gtg	agc	cca	cct	ctc	aaa	aaa	acc	aag	tca	aac	2
Gln	Asn	Val	Thr	Thr	Val	Ser	Pro	Pro	Leu	Lys	Lys	Thr	Lys	Ser	Asn	
				85					90					95		
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36 Ile	Asn	Leu	Glu	Ile	Ser	Ala	Pro	Leu	Thr	Val	Thr	Ser	Glu	Ala	Leu	
			100					105					110			
			100					105								
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	Val	Ala	Ala	Ala	Ala	Pro	Leu	Met	Val	Ala	Gly	Asn	Thr	Leu	Thr	
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Met	Gln	Ser	Gln	Ala	Pro	Leu	Thr	Val	His	Asp	Ser	Lys	Leu	Ser	Ile	
	130					135					140					
80	acc								_		_		_			4
Ala	Thr	Gln	Gly	Pro	Leu	Thr	Val	Ser	Glu	Gly	Lys	Leu	Ala	Leu	Gln	
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Lys	Glu	Pro	Ile	Tyr	Thr	Gln	Asn	Gly	Lys	Leu	Gly	Leu	Lys	Tyr	Gly	
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225					230					235					240	
gga 68	gcc	ttg	ggt	ttt	gat	tca	caa	ggc	aat	atg	caa	ctt	aat	gta	gca	7
	Ala	Leu	Gly	Phe	Asp	Ser	Gln	Gly	Asn	Met	Gln	Leu	Asn	Val	Ala	
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gga 16	gga	cta	agg	att	gat	tct	caa	aac	aga	cgc	ctt	ata	ctt	gat	gtt	8
	Gly	Leu	Arg	Ile	Asp	Ser	Gln	Asn	Arg	Arg	Leu	Ile	Leu	Asp	Val	
			260					265					270			
agt 64	tat	ccg	ttt	gat	gct	caa	aac	caa	cta	aat	cta	aga	cta	gga	cag	8
	Tyr	Pro	Phe	Asp	Ala	Gln	Asn	Gln	Leu	Asn	Leu	Arg	Leu	Gly	Gln	
		275					280					285				
								Page	84							

	cct	ctt	ttt	ata	aac	tca	gcc	cac	aac	ttg	gat	att	aac	tac	aac	9
12 Gly	Pro	Leu	Phe	Ile	Asn	Ser	Ala	His	Asn	Leu	Asp	Ile	Asn	Tyr	Asn	
	290					295					300					
																9
			tac													9
Lys	Gly	Leu	Tyr	Leu	Phe	Thr	Ala	Ser	Asn	Asn	Ser	Lys	Lys	Leu	Glu	
305					310					315					320	
a++	220	cta	agc	act	acc	aaq	aaa	ttq	atq	ttt	gac	gct	aca	gcc	ata	10
0.0			Ser													
Val	Asn	Leu	Ser	Thr	Ата	гув	GIY	пеп		riic	пор					
				325					330					335		
										~~+	tas	cct	aat	aca	cca	10
															cca	
Ala	Ile	Asn	Ala	Gly	Asp	Gly	Leu	. Glu	Phe	Gly	Ser	Pro	Asn	. Ala	Pro	
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0.4															gat	11
Asr	Thr	Asr	Pro	Leu	Lys	Thi	Lys	: Ile	e Gly	His	Gly	Leu	Glu	Ph∈	Asp	
		355	5				360)				365	,			
	a aac	aaq	g gct	: atg	gtt	cct	aaa	a cta	a gga	a act	ggo	ctt	: agt	ttt	gac	11
52 Se:	r Ası	ı Ly:	s Ala	a Met	. Val	l Pro	b Lys	s Lei	ı Gly	Th:	r Gly	Let	ı Sei	Phe	qaA s	
	370)				37	5				380)				
	c ac	a gg	t gc	att	aca	a gt	a gg	a aa	c aaa	a aa	t aat	gat	aaq	g ct	a act	12
00 Se	r Th	r Gl	y Ala	a Ile	e Th	r Va	1 G1	y As	n Ly:	s As:	n Ası	n Ası) Ly	s Le	u Thr	
			-													

4-31452A.ST25.txt 385 390 395 400

ttq tqq acc aca cca qct cca tct cct aac tqt aqa cta aat qca qaq Leu Trp Thr Thr Pro Ala Pro Ser Pro Asn Cys Arg Leu Asn Ala Glu aaa qat qct aaa ctc act ttg gtc tta aca aaa tgt ggc agt caa ata Lys Asp Ala Lys Leu Thr Leu Val Leu Thr Lys Cys Gly Ser Gln Ile ctt qct aca qtt tca qtt ttq qct qtt aaa qqc aqt ttq qct cca ata Leu Ala Thr Val Ser Val Leu Ala Val Lys Gly Ser Leu Ala Pro Ile tct gga aca gtt caa agt gct cat ctt att ata aga ttt gac gaa aat Ser Gly Thr Val Gln Ser Ala His Leu Ile Ile Arg Phe Asp Glu Asn gga gtg cta cta aac aat tcc ttc ctg gac cca gaa tat tgg aac ttt Gly Val Leu Leu Asn Asn Ser Phe Leu Asp Pro Glu Tyr Trp Asn Phe aga aat gga gat ctt act gaa ggc aca gcc tat aca aac gct gtt gga Arg Asn Gly Asp Leu Thr Glu Gly Thr Ala Tyr Thr Asn Ala Val Gly ttt atg cet aac eta tea get tat eca aaa tet eac ggt aaa act gee

Phe Met Pro Asn Leu Ser Ala Tyr Pro Lys Ser His Gly Lys Thr Ala Page 86

510

aaa agt aac att gtc agt caa gtt tac tta aac gga gac aaa act aaa 15 Lys Ser Asn Ile Val Ser Gln Val Tyr Leu Asn Gly Asp Lys Thr Lys 525 520 515 cct gta aca cta acc att aca cta aac cag gaa aca gga gac aca act 16 Pro Val Thr Leu Thr Ile Thr Leu Asn Gln Glu Thr Gly Asp Thr Thr 540 535 530 cca agt gca tac tct atg tca ttt tca tgg gac tgg tct ggc cac aac 16 Pro Ser Ala Tyr Ser Met Ser Phe Ser Trp Asp Trp Ser Gly His Asn 560 555 545 550 tac att aat gaa ata ttt gcc aca tcc tct tac act ttt tca tac att 17 Tyr Ile Asn Glu Ile Phe Ala Thr Ser Ser Tyr Thr Phe Ser Tyr Ile 575 570 565 17 qcc caa gaa taa 40

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<212> PRT

<213> Artificial

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<400> 20

Met Lys Arg Ala Arg Pro Ser Glu Asp Thr Phe Asn Pro Val Tyr Pro Page 87

in.

4-31452A.ST25.txt 1 5 10

Tyr Asp Thr Glu Thr Gly Pro Pro Thr Val Pro Phe Leu Thr Pro Pro 20 25 30

15

Phe Val Ser Pro Asn Gly Phe Gln Glu Ser Pro Pro Gly Val Leu Ser 35 40 45

Leu Arg Leu Ser Glu Pro Leu Val Thr Ser Asn Gly Met Leu Ala Leu 50 55 60

Lys Met Gly Asn Gly Leu Ser Leu Asp Glu Ala Gly Asn Leu Thr Ser 65 70 75 80

Gln Asn Val Thr Thr Val Ser Pro Pro Leu Lys Lys Thr Lys Ser Asn $85 \hspace{1.5cm} 90 \hspace{1.5cm} 95$

Ile Asn Leu Glu Ile Ser Ala Pro Leu Thr Val Thr Ser Glu Ala Leu $100 \hspace{1.5cm} 105 \hspace{1.5cm} 110 \hspace{1.5cm}$

Thr Val Ala Ala Ala Ala Pro Leu Met Val Ala Gly Asn Thr Leu Thr 115 120 125

Met Gln Ser Gln Ala Pro Leu Thr Val His Asp Ser Lys Leu Ser Ile 130 $$135\$

Ala Thr Gln Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Ala Leu Gln 145 150 155 160

Thr Ser Gly Pro Leu Thr Thr Thr Asp Ser Ser Thr Leu Thr Ile Thr $165 \hspace{1.5cm} 170 \hspace{1.5cm} 175 \hspace{1.5cm}$

Ala Ser Pro Pro Leu Thr Thr Ala Thr Gly Ser Leu Gly Ile Asp Leu 180 185 190

Lys Glu Pro Ile Tyr Thr Gln Asn Gly Lys Leu Gly Leu Lys Tyr Gly Page 88 Ala Pro Leu His Val Thr Asp Asp Leu Asn Thr Leu Thr Val Ala Thr 210 215220

Gly Pro Gly Val Thr Ile Asn Asn Thr Ser Leu Gln Thr Lys Val Thr 225 230 235

Gly Ala Leu Gly Phe Asp Ser Gln Gly Asn Met Gln Leu Asn Val Ala $245 \hspace{1.5cm} 250 \hspace{1.5cm} 255$

Gly Gly Leu Arg Ile Asp Ser Gln Asn Arg Arg Leu Ile Leu Asp Val 260 265 270

Ser Tyr Pro Phe Asp Ala Gln Asn Gln Leu Asn Leu Arg Leu Gly Gln 275 280 285

Gly Pro Leu Phe Ile Asn Ser Ala His Asn Leu Asp Ile Asn Tyr Asn 290 295 300

Lys Gly Leu Tyr Leu Phe Thr Ala Ser Asn Asn Ser Lys Lys Leu Glu 305 310 315 320

Val Asn Leu Ser Thr Ala Lys Gly Leu Met Phe Asp Ala Thr Ala Ile 325 330 335

Ala Ile Asn Ala Gly Asp Gly Leu Glu Phe Gly Ser Pro Asn Ala Pro 340 345 350

Asn Thr Asn Pro Leu Lys Thr Lys Ile Gly His Gly Leu Glu Phe Asp 355 360 365

Ser Asn Lys Ala Met Val Pro Lys Leu Gly Thr Gly Leu Ser Phe Asp 370 380

Ser Thr Gly Ala Ile Thr Val Gly Asn Lys Asn Asn Asp Lys Leu Thr Page 89 DEBYDEDS DESERVE

Lys Asp Ala Lys Leu Thr Leu Val Leu Thr Lys Cys Gly Ser Gln Ile $420 \hspace{1.5cm} 425 \hspace{1.5cm} 430 \hspace{1.5cm}$

Leu Ala Thr Val Ser Val Leu Ala Val Lys Gly Ser Leu Ala Pro Ile $\frac{435}{440}$

Ser Gly Thr Val Gln Ser Ala His Leu Ile Ile Arg Phe Asp Glu Asn 450 455

Gly Val Leu Leu Asn Asn Ser Phe Leu Asp Pro Glu Tyr Trp Asn Phe 465 470 470 480

Phe Met Pro Asn Leu Ser Ala Tyr Pro Lys Ser His Gly Lys Thr Ala 500 505 510

Lys Ser Asn Ile Val Ser Gln Val Tyr Leu Asn Gly Asp Lys Thr Lys $515 \hspace{1.5cm} 520 \hspace{1.5cm} 520 \hspace{1.5cm} 525 \hspace{1.5cm}$

Pro Val Thr Leu Thr Ile Thr Leu Asn Gln Glu Thr Gly Asp Thr Thr 530 535 540

Pro Ser Ala Tyr Ser Met Ser Phe Ser Trp Asp Trp Ser Gly His Asn 545 550 550 555 560

Tyr Ile Asn Glu Ile Phe Ala Thr Ser Ser Tyr Thr Phe Ser Tyr Ile 565 570 570

Ala Gln Glu

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 38
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4-31452A.ST25.txt <220> <223> PCR primer <220> <221> primer bind <222> (1)..(36) <400> 29 gtttcagttt tggctgctgc aggcagtttg gctcca 36 <210> 30 <211> 36 <212> DNA <213> Artificial <220> <223> PCR primer <220> <221> primer bind <222> (1)..(36) <400> 30 tggagccaaa ctgcctgcag cagccaaaac tgaaac 36 <210> 31 <211> 36 <212> DNA <213> Artificial <220> <223> PCR primer <220> <221> primer_bind <222> (1)..(36) <400> 31 gctcatctta ttatagaatt cgacgaaaat ggagtg 36 <210> 32 <211> 36

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4-31452A.ST25.txt
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4-31452A.ST25.txt ataagatttg acgaaactgg agtgctacta aac 33 <210> 38 <211> 33 <212> DNA <213> Artificial <220> <223> PCR primer <220> <221> primer_bind <222> (1)..(33) <400> 38 gtttagtagc actccagttt cgtcaaatct tat 33 <210> 39 <211> 33 <212> DNA <213> Artificial <220> <223> PCR primer <220> <221> primer bind <222> (1)..(33) <400> 39 tttgacgaaa atggacacct actaaacaat tcc 33 <210> 40 <211> 33

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<221> primer_bind

Page 97

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4-31452A.ST25.txt
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